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| EXAMINER | |
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| HOLDER, ANNER N | |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| *Office Action Summary* | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/811,982 | PURI ET AL. | |
| | **Examiner** | **Art Unit** | |
| | ANNER HOLDER | 2621 | |

***-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --***

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *12/15/08*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments with respect to claims 1-14, 17-19, and 21-27 have been considered but are moot in view of the new ground(s) of rejection.

2. Applicant's arguments filed 07/13/09 have been fully considered but they are not persuasive. As to Applicant's arguments the Examiner respectfully disagrees. Regarding Tajime the complexity measure is used in determining the quantizer step size which is apart of a feedback loop that is used in the determining of the target bit rate. [col. 8 lines 6-26; fig. 1; fig. 2; fig. 6; col. 10 lines 25-28] Tajime taken in combination with Hanamura whose buffer is used to control the transmission of the data based on the feedback loop provide within the circuit from the VLC. [fig. 1; fig. 5; fig. 6; col. 21 lines 11-67] Nagumo teaches the limitations as clamed in claim 6. Nagumo selectively cancels motion vectors (which are understood to be considered as frame data) of coded blocks in the picture according to a rate control policy selected for the picture (raising the frame rate of the motion picture is in accordance with the selected rate control for the selected picture). [Col. 20 lines 21-44] Regarding Hsia, the Q-slice disclosed represents the entire frame when the fame is an I-frame thus all slices are equal. Further, the complexity is represented when there are a number of slices within the frame that are different. Hsia teaches the comparison of the current and previous quantization value. [fig. 3] The prior art fairly suggest and teaches the limitations as claimed. Mitchell teaches any mapping which includes those done by the complexity, thus it reads upon the limitation as claimed. [Mitchell - Col. 6 lines 26-34].

3. Applicant's arguments, see page 15 Claim Rejections - 35 USC 101, filed 07/13/09, with respect to claims 1-14 and 21-26 have been fully considered and are persuasive. The rejection of claims 1-14 and 21-26 has been withdrawn.

## *Claim Rejections - 35 USC § 103*

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-4,13-14, 28-31, and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tajime US 6,915,018 B1 in view Hanamura et al US 6,587,508 B1 in view of Yanagihara US 5,374,958 further in view of Ribas-Corbera et al. (Ribas) US 6,111,991.

6. As to claim 1, Tajime teaches determining a target bitrate for a picture in the sequence based on the picture's complexity, [col. 8 lines 6-26; fig. 1; fig. 2; fig. 6] generating a first quantizer estimate for the picture based on a fullness indicator from a transmit buffer of a video coder, [col. 8 lines 6-26; fig. 1; fig. 2; fig. 6; the feedback loop from the coder provides the buffer fullness indication] generating a second quantizer estimate for the picture of quantizer assignments made to prior pictures of a same type, actual coding rates achieved by such quantizer assignments and the target bitrate, and selecting a quantizer based on a difference between the two quantizer estimates and based on the picture's complexity. [fig. 1; fig. 2; col. 7 line 66 - col. 8 line 37; col. 10 lines 23-33]

Tajime discloses the use of a feedback loop from the coding device which adjusts the bit rate of the system acting as a buffer fullness indicator. [col. 8 lines 6-26; fig. 1; fig. 2; fig. 6; the feedback loop from the coder provides the buffer fullness indication] However,

Tajime does not explicitly state generating a second quantizer estimate for the picture of quantizer assignments made to prior pictures of a same type, actual coding rates achieved by such quantizer assignments and the target bitrate, and selecting a quantizer based on a difference between the two quantizer estimates and based on the picture's complexity and a buffer full indicator.

Hanamura teaches the use of a buffer fullness indicator from a transmit buffer. [fig. 1; fig. 5; fig. 6; col. 21 lines 11-67]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hanamura with the device of Tajime allowing for effective rate control in transmission of data. [col. 11 lines 23-24]

Tajime (modified by Hanamura) does not explicitly teach generating a second quantizer estimate for the picture of quantizer assignments made to prior pictures of a same type, actual coding rates achieved by such quantizer assignments and the target bitrate, and selecting a quantizer based on a difference between the two quantizer estimates and based on the picture's complexity.

Yanagihara teaches generating a second quantizer estimate [fig. 11 (9); fig. 14 (40n); for the picture of quantizer assignments made to prior pictures of a same type, actual coding rates achieved by such quantizer assignments and the target bitrate, and selecting a quantizer based on a difference between the two quantizer estimates and

based on the picture's complexity. [fig. 11 (9); fig. 14 (40n); col. 12 lines 6-9, 20-38; col. 13 lines 62-67; col. 14 lines 1-12;

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Yanagihara with the device of Tajime modified by Hanamura allowing for improved image quality.

Tajime (modified by Hanamura and Yanagihara) does not explicitly teach the use of linear regression regarding a quantizer.

Ribas teaches linear regression in determining a quanizer value. [col. 6 lines 62-65; col. 7 lines 37-48]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the linear regression teachings of Ribas with the device of Tajime (modified Hanamura and Yanagihara) improving image quality and coding efficiency. [col. 2 lines 33-36]

7. As to claim 2, Tajime (modified by Hanamura, Yanagihara and Ribas) teaches the picture's complexity is determined by analyzing spatial complexity within the picture. [Tajime - fig. 1; fig. 2; col. 7 lines 38 - col. 8 line 10]

8. As to claim 3, Tajime (modified by Hanamura, Yanagihara and Ribas) teaches the picture's complexity is determined by analyzing motion complexity of the picture with respect to previously coded pictures. [Tajime - fig. 1; fig. 2; col. 7 lines 38 - col. 8 line 10]

9. As to claim 4, Tajime (modified by Hanamura, Yanagihara and Ribas) teaches the picture's complexity is determined by analyzing a number of bits used to represent

each pixel in the picture. [Tajime - col. 9 lines 22-61; Yanagihara - col. 2 lines 33-48; col. 5 line 7-19; col. 12 lines 10-19; col. 14 lines 6-16]

10. As to claim 13, Tajime (modified by Hanamura, Yanagihara and Ribas) teaches when the picture is an I picture, the linear regression is performed using predetermined assumed values for the prior quantizer assignments and actual coding rates. [Ribas - col. 6 lines 62-65; col. 7 lines 37-48]

11. As to claim 14, Tajime (modified by Hanamura, Yanagihara and Ribas) teaches when the picture is an P picture, the linear regression is performed using quantizer assignments and actual coding rates for three prior P pictures. [Ribas - col. 6 lines 62-65; col. 7 lines 37-48]

12. As to claim 28, see discussion of claim 1 above.

13. As to claim 29, see discussion of claim 2 above.

14. As to claim 30, see discussion of claim 3 above.

15. As to claim 31, see discussion of claim 4 above.

16. As to claim 40, see discussion of claim 13 above.

17. Claims 5 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tajime US 6,915,018 B1 in view Hanamura et al US 6,587,508 B1 in view of Yanagihara US 5,374,958 in view of Ribas-Corbera et al. (Ribas) US 6,111,991 further in view Nishikawa et al. US 6,222,887.

18. As to claim 5, Tajime (modified by Hanamura, Yanagihara and Ribas) teaches limitations of claim 1.

Tajime (modified by Hanamura, Yanagihara and Ribas) does not explicitly teach selectively canceling transform coefficients of coded blocks in the picture according to a rate control policy selected for the picture.

Nishikawa teaches selectively canceling transform coefficients of coded blocks in the picture according to a rate control policy selected for the picture. [fig. 14; col. 28 lines 46-63; col. 29 lines 14-33]

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Nishikawa with the device of Tajime (modified by Hanamura, Yanagihara and Ribas) to improve image quality.

19. As to claim 32, see discussion of claim 5 above.

20. Claims 6 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tajime US 6,915,018 B1 in view Hanamura et al US 6,587,508 B1 in view of Yanagihara US 5,374,958 in view of Ribas-Corbera et al. (Ribas) US 6,111,991 further in view Nagumo et al. US 7,158,570 B2.

21. As to claim 6, Tajime (modified by Hanamura, Yanagihara and Ribas) teaches the limitations of claim 1.

Tajime (modified by Hanamura, Yanagihara and Ribas) does not explicitly teach selectively canceling motion vectors of coded blocks in the picture according to a rate control policy selected for the picture.

Nagumo teaches selectively canceling motion vectors of coded blocks in the picture according to a rate control policy selected for the picture. [Col. 20 lines 21-44]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Nagumo with the device of Tajime (modified by Hanamura, Yanagihara and Ribas) to improve image quality.

22. As to claim 33, see discussion of claim 6 above.

23. Claims 7 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tajime US 6,915,018 B1 in view Hanamura et al US 6,587,508 B1 in view of Yanagihara US 5,374,958 in view of Ribas-Corbera et al. (Ribas) US 6,111,991 in view of Hsia US 2004/0146108 A1 and further in view of Sugiyama US 6,940,911 B2.

24. As to claim 7, Tajime (modified by Hanamura, Yanagihara and Ribas) teaches the limitations of claim 1.

Tajime (modified by Hanamura, Yanagihara and Ribas) does not explicitly teach decimating pictures within the video sequence according to a rate control policy selected for the picture.

Sugiyama teaches decimating pictures within the video sequence according to a rate control policy selected for the picture. [Fig. 7; Fig. 11; Fig. 14; Col. 15 lines 10-19, 61-67; Col. 16 lines 3-7]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Sugiyama with the device of Tajime (modified by Hanamura, Yanagihara and Ribas) allowing for improving the image quality.

25. As to claim 34, see discussion of claim 7 above.

26. Claims 8 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tajime US 6,915,018 B1 in view Hanamura et al US 6,587,508 B1 in view of Yanagihara US 5,374,958 in view of Ribas-Corbera et al. (Ribas) US 6,111,991 further in view of Chiang et al. US 6,192,081 B1.

27. As to claim 8, Tajime (modified by Hanamura, Yanagihara and Ribas) teaches the limitations of claim 1.

Tajime (modified by Hanamura and Ribas) does not explicitly teach selecting a coding mode for blocks of the picture according to a rate control policy selected for the picture.

Chiang teaches selecting a coding mode for blocks of the picture according to a rate control policy selected for the picture. [fig. 1; col. 3 lines 33-35; col. 4 lines 44-61; col. 6 lines 58-67]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Chiang with the device of Tajime (modified by Hanamura, Yanagihara and Ribas) allowing for improved coding efficiency.

28. As to claim 35, see discussion of claim 8 above.

29. Claims 9 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tajime US 6,915,018 B1 in view Hanamura et al US 6,587,508 B1 in view of Yanagihara US 5,374,958 in view of Ribas-Corbera et al. (Ribas) US 6,111,991 further in view of Riek et al. US 7,148,908.

30. As to claim 9, Tajime (modified by Hanamura, Yanagihara and Ribas) teaches the target bitrate is determined based on a number of bits (R) allocated to represent a group of pictures to which the picture belongs. [col. 8 lines 6-26; fig. 1; fig. 2; fig. 6]

Tajime (modified by Hanamura and Ribas) does not explicitly teach a number (N) of like-kind pictures that will occur in the group of pictures.

Riek teaches a number (N) of like-kind pictures that will occur in the group of pictures. [col. 3 lines 29-64]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Riek with the device of Tajime (modified by Hanamura, Yanagihara and Ribas) to allow for improved image quality.

31. As to claim 36, see discussion of claim 9 above.

32. Claims 10-12 and 37-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tajime US 6,915,018 B1 in view Hanamura et al US 6,587,508 B1 in view of Yanagihara US 5,374,958 in view of Ribas-Corbera et al. (Ribas) US 6,111,991 further in view of Hui US 6,654,417.

33. As to claim 10, Tajime (modified by Hanamura, Yanagihara and Ribas) teaches the limitations of claim 9.

Tajime (modified by Hanamura, Yanagihara and Ribas) does not when the picture is an I picture, the target bitrate T.sub.i is determined by: T i = max [ R ( 1 + N P X P X I K P + N B X B X I K B ) , bitrate 8 * picturerate ] , where R represents a number of bits allocated to code a group of pictures in which the I picture resides, N.sub.P and N.sub.B

respectively represent the number of P and B pictures that appear in a group of frames, X.sub.I and X.sub.P respectively represent complexity estimates for the I and P pictures in the group of frames, K.sub.P is a constant, K.sub.B is determined based on the complexity indicators, bitrate represents the number of bits allocated for coding of the group of pictures, and picturerate represents the number of pictures in the group of pictures.

Hui teaches when the picture is an I picture, the target bitrate T.sub.i is determined by: T i = max [ R ( 1 + N P X P X I K P + N B X B X I K B ) , bitrate 8 * picturerate ] , where R represents a number of bits allocated to code a group of pictures in which the I picture resides, N.sub.P and N.sub.B respectively represent the number of P and B pictures that appear in a group of frames, X.sub.I and X.sub.P respectively represent complexity estimates for the I and P pictures in the group of frames, K.sub.P is a constant, K.sub.B is determined based on the complexity indicators, bitrate represents the number of bits allocated for coding of the group of pictures, and picturerate represents the number of pictures in the group of pictures. [Hui - Col. 6 line 55- Col. 7 line 5; Col. 11 lines 40-60]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Hui with the device of Tajime (modified by Hanamura, Yanagihara and Ribas) allowing to improved image quality and coding.

34. As to claim 11, Tajime (modified by Hanamura, Yanagihara, Ribas and Hui) teaches when the picture is a P picture, the target bitrate T.sub.p is determined by: T P = max [ R ( N P + N B K P X B K B X P ) , bitrate 8 * picturerate ] , where R represents a number of bits allocated to code a group of pictures in which the P picture resides,

N.sub.P and N.sub.B respectively represent the number of P and B pictures that appear in a group of frames, X.sub.I and X.sub.P respectively represent complexity estimates for the I and P pictures in the group of frames, K.sub.P is a constant, K.sub.B is determined based on the complexity indicators, bitrate represents the number of bits allocated for coding of the group of pictures, and picturerate represents the number of pictures in the group of pictures. [Hui - Col. 6 line 55- Col. 7 line 5; Col. 11 lines 40-65]

35. As to claim 12, Tajime (modified by Hanamura, Yanagihara, Ribas) and Hui) teaches when the picture is a B picture, the target bitrate T.sub.b is determined by: 16 T B = max [ R ( N B + N P K B X P K P X B ) , bitrate 8 * picturerate] , where N.sub.P and N.sub.B respectively represent the number of P and B pictures that appear in a group of frames, X.sub.I and X.sub.P respectively represent complexity estimates for the I and P pictures in the group of frames, K.sub.P is a constant, K.sub.B is determined based on the complexity indicators, bitrate represents the number of bits allocated for coding of the group of pictures, and picturerate represents the number of pictures in the group of pictures. [Hui - Col. 6 line 55- Col. 7 line 5; Col. 11 lines 10-65]

36. As to claim 37, see discussion of claim 10 above.

37. As to claim 38, see discussion of claim 11 above.

38. As to claim 39, see discussion of claim 12 above.

39. Claims 15-16 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsia US 2004/0146108 A1 in view of Ribas-Corbera et al. (Ribas) US 6,111,991.

40. As to claim 15, Hsia teaches a scene content analyzer having an input for source video data and an output for complexity indicators representing complexity of each picture in the source video data, a first quantizer estimator [Abstract; Fig. 3 (Scene Detection Module, Quantization Decision Module, and Picture Type Decision Module); Pg. 4-5 ¶ 0045-0046] having an input for the source video data and complexity indicators, to generate a quantizer estimate of a picture based on a calculation of a target rate for coding the picture, [Fig. 3 (Quantization Decision Module); Abstract; Pg. 0044] a second quantizer estimator having an input for the complexity indicators and past values of quantizer selections and coding rates achieved therefrom, the second quantizer estimator to generate a second quantizer estimate for the picture based on a prior quantizer selections and coding rates for like-kind pictures, [Fig. 3 (Quantization Decision Module)] and a coding adapter, having inputs for the two quantizer estimates and the complexity indicators to select a quantizer for the picture based on a difference of the two quantizer estimates. [Abstract; Fig. 3 (Scene Detection Module, Quantization Decision Module, and Picture Type Decision Module); Pg. 4-5 ¶ 0045-0046]

Hsia is silent as to linear regression modeling quantization.

Ribas teaches linear regression modeling quantization. [col. 6 lines 62-65; col. 7 lines 37-48]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the linear regression teachings of Ribas with the device of Hsia improving image quality and coding efficiency.

41. As to claim 16, Hsia (modified by Ribas) teaches the coding adapter comprises a subtractor having inputs for the two quantizer estimates. [Hsia - Abstract; Fig. 3 (Scene Detection Module – Scene Change Detection); Pg. 4-5 ¶ 0044-0046]

42. As to claim 41, see discussion of claim 5 above.

43. Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsia US 2004/0146108 A1 in view of Ribas-Corbera et al. (Ribas) US 6,111,991 further in view of Hurst, Jr. US 6,915,018 B1.

44. As to claim 17, Hsia (modified by Ribas) teaches the limitation of a subtractor having inputs for the two quantizer estimates. [Fig. 3 (Scene Detection Module); Pg. 4-5 ¶ 0045]

Hsia (modified by Ribas) is silent as to a clipper coupled to an output of the subtractor.

Hurst teaches a clipper coupled to an output of the subtractor. [figs. 2-3; fig 7; col. 4 lines 18-35, 58-65]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the clipper teachings of Hurst with the device of Hsia modified by Ribas to allow for removal of errors within an allowed range.

45. As to claim 18, Hsia (modified by Ribas and Hurst) teaches a divider coupled to the output of the clipper. [Hurst - figs. 2-3; fig 7; col. 4 lines 18-35, 58-65]

46. As to claim 19, Hsia (modified by Ribas and Hurst) teaches a subtractor having a first input coupled to the output of the clipper and a second input for a value of a quantizer of a previously processed picture. [Hsia – Fig. 3 (Mode Decision Mode)]

47. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsia US 2004/0146108 A1 in view of Ribas-Corbera et al. (Ribas) US 6,111,991 further in view Mitchell et al. (Mitchell) US 6,256,422 B1.

48. As to claim 20, Hsia (modified by Ribas) teaches the limitations of claim 15.

Hsia (modified by Ribas) does not explicitly teach the coding adapter comprises a lookup table indexed by a complexity indicator representing complexity of the picture and the picture's coding type.

Mitchell teaches the coding adapter comprises a lookup table indexed by a complexity indicator representing complexity of the picture and the picture's coding type. [Mitchell - Col. 6 lines 26-34]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Mitchell with the device of Hsia (modified by Ribas) allowing for improved coding efficiency.

49. Claims 21-27 and 42-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pau US 6,223,193 B1 in view of Ar US 5,526,052.

50. As to claim 21, Pau teaches for a plurality of macroblocks of an input picture, computing variances of a plurality of blocks therein, [fig. 9; abstract; fig. 12; col. 6 lines

43-60; col. 7 lines 1-5] calculating an activity level of the input picture from the variances, [fig. 9; abstract; fig. 12; col. 6 lines 43-60; col. 7 lines 1-5]

Pau does not explicitly teach comparing minimum variance values of the plurality of macroblocks to corresponding minimum variance values of macroblocks from a prior picture, comparing the activity level of the input picture to an activity level of the prior picture, and generation of a scene change decision.

Ar teaches comparing minimum variance values of the plurality of macroblocks to corresponding minimum variance values of macroblocks from a prior picture, comparing the activity level of the input picture to an activity level of the prior picture, and generation of a scene change decision. [fig. 6; col. 5 lines 7-35]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Ar with the device of Pau improving image quality and coding efficiency.

51. As to claim 22, Pau (modified by Ar) teaches averaging the minimum variance values of each macroblock in the input picture, averaging minimum variance values of each macroblock in the prior picture, and comparing the average minimum variance values of the input picture to the average minimum variance values of the prior picture. [Pau - fig. 9; abstract; fig. 12; col. 6 lines 43-60; col. 7 lines 1-5; Ar - fig. 6; col. 5 lines 7-35]

52. As to claim 23, Pau (modified by Ar) teaches averaging the minimum variance values of each macroblock in the input picture, averaging minimum variance values of each macroblock in the prior picture, normalizing each of the average minimum

variance values, [Pau - fig. 9; abstract; fig. 12; col. 6 lines 43-60; col. 7 lines 1-5] and determining a ratio between the normalized values of the input picture to the normalized values of the prior picture, and comparing the ratio to a predetermined threshold. [Pau - fig. 9; abstract; fig. 12; col. 6 lines 43-60; col. 7 lines 1-5; Ar - fig. 6; col. 5 lines 7-35]

53. As to claim 24, Pau (modified by Ar) teaches averaging variances of all blocks in the picture, and comparing the average variance value to the average minimum variance value for the picture. [Pau - fig. 9; abstract; fig. 12; col. 6 lines 43-60; col. 7 lines 1-5; Ar - fig. 6; col. 5 lines 7-35]

54. As to claim 25, Pau (modified by Ar) teaches the comparison of activity levels comprises: determining a ratio between the activity level of the input picture and the activity level of the prior picture, and comparing the ratio to a predetermined threshold. [Pau - fig. 9; abstract; fig. 12; col. 6 lines 43-60; col. 7 lines 1-5]

55. As to claim 26, Pau (modified by Ar) teaches normalizing activity levels for the input picture, normalizing activity levels for the prior picture, and comparing the normalized activity levels to each other. [Pau - fig. 9; abstract; fig. 12; col. 6 lines 43-60; col. 7 lines 1-5]

56. As to claim 27, Pau teaches variance calculator to calculate a plurality of variance values for each macroblock in a source image, [fig. 9; abstract; fig. 12; col. 6 lines 43-60; col. 7 lines 1-5] a minimum variance selector to select a minimum variance value for each macroblock, [fig. 9; abstract; fig. 12; col. 6 lines 43-60; col. 7 lines 1-5] a memory to store minimum variance values of a previously processed image, [col. 6 lines 28-42] an averager to calculate an average variance value for each macroblock, [fig. 9;

abstract; fig. 12; col. 6 lines 43-60; col. 7 lines 1-5] an activity calculate to calculate an activity level of the source image from the average variance values. [fig. 9; abstract; fig. 12; col. 6 lines 43-60; col. 7 lines 1-5]

Pau is silent as to comparing minimum variance values of the plurality of macroblocks to corresponding minimum variance values of macroblocks from a prior picture, comparing the activity level of the input picture to an activity level of the prior picture, and generation of a scene change decision; decision logic to signal that the scene change based on a comparison of an output from the comparator and the activity level of the source image.

Ar teaches comparing minimum variance values of the plurality of macroblocks to corresponding minimum variance values of macroblocks from a prior picture, comparing the activity level of the input picture to an activity level of the prior picture, and generation of a scene change decision; [fig. 6; col. 5 lines 7-35] decision logic to signal that the scene change based on a comparison of an output from the comparator and the activity level of the source image. [fig. 6; col. 5 lines 7-35]

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of Ar with the device of Pau improving image quality.

57. As to claim 42, see discussion of claim 21 above.

58. As to claim 43, see discussion of claim 22 above.

59. As to claim 44, see discussion of claim 23 above.

60. As to claim 45, see discussion of claim 24 above.

61. As to claim 46, see discussion of claim 25 above.

62. As to claim 47, see discussion of claim 26 above.

***Conclusion***

63. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANNER HOLDER whose telephone number is (571)270-1549. The examiner can normally be reached on M-W, M-W 8 am-3 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on 571-272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Anner Holder/
Examiner, Art Unit 2621

/Tung Vo/
Primary Examiner, Art Unit 2621